AUG/FY06

TWIN CITIES ARMY AMMUNITION PLANT

Minnesota

Army Defense Environmental Restoration Program Installation Action Plan

Final 5 Sept 2006

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Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year Installation Restoration Program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern, and proposes a comprehensive, installation-wide approach, with associated costs and schedules, to conduct investigations and necessary remedial actions.

In an effort to coordinate planning information between the restoration manager, US Army Environmental Center (USAEC), Twin Cities Army Ammunition Plant (TCAAP), Base Realignment and Closure Division (BRACD), executing agencies, regulatory agencies, and the public, an IAP was completed. The IAP is used to track requirements, schedules, and tentative budgets for all major Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

The following agencies contributed to the formulation and completion of this Installation Action Plan at the IAP Workshop held 1 June 2006:

Alliant Techsystems Inc.
Engineering & Environment, Inc./USAEC
Minnesota Pollution Control Agency
Restoration Advisory Board (RAB) Community Co-Chair
TCAAP
TCAAP, Commander's Representative
US Army Environmental Center
US Army National Guard – Minnesota
US Environmental Protection Agency, Region V
Wenck Associates, Inc.

Acronyms & Abbreviations

ACSIM	Assistant Chief of Staff for Installation Management
AEDB-R	Army Environmental Database – Restoration
AST	Aboveground Storage Tank
ATK	Alliant Techsystems Inc.
BGRS	Boundary Groundwater Recovery System
Bldg	Building
BRAC	Base Realignment and Closure
BRACD	Base Realignment and Closure Division
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response Compensation and Liability Act (1980)
COC	Contaminant of Concern
CTC	Cost-to-Complete
cy	cubic yards
DD	Decision Document
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
DSMOA	Defense, State Memorandum of Agreement
DU	Depleted Uranium
EDTA	Ethylenediaminetetraacetic Acid
EE/CA	Engineering Evaluation/Cost Analysis
EPA	(United States) Environmental Protection Agency
ER,A	Environmental Restoration, Army
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
FFA	Federal Facility Agreement
FOSET	Finding of Suitability for Early Transfer
FOST	Finding of Suitability to Transfer
FS	Feasibility Study
FY	Fiscal Year (1 October to 30 September)
GAC	Granular Activated Carbon
GRS	Groundwater Recovery System
GW	Groundwater
HHRA	Human Health Risk Assessment
HRI	Hazard Ranking Index
IAG	Inter-Agency Agreement
IAP	Installation Action Plan
IRA	Interim Remedial Action
IRD	Interim Remedial Design
IRP	Installation Restoration Program
ISO	Installation Support Operation
ISV	In Situ Volatilization
lbs	pounds
LitSAG	Litigation Settlement Agreement

Acronyms & Abbreviations

LTM	Long-term Management
LTO	Long-term Operation
LUC	Land Use Control
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MN	Minnesota
MPCA	Minnesota Pollution Control Agency
NBCGRS	New Brighton Contaminated Groundwater Recovery System
NE	Not Evaluated
NFA	No Further Action
NOV	Notice of Violation
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
O&M	Operation & Maintenance
Ops	Operations
OU-1	Operable Unit 1
OU-2	Operable Unit 2
OU-3	Operable Unit 3
PA	Preliminary Assessment
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PGAC	Permanent Granular Activated Carbon
PGRS	Plume Groundwater Recovery System
PRP	Potentially Responsible Party
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RA(C)	Remedial Action – Construction
RA(O)	Remedial Action – Operation
RAB	Restoration Advisory Board
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
REM	Removal Action
RI	Remedial Investigation
RIP	Remedy-in-Place
ROD	Record of Decision
RRG	Recommended Remediation Goals
RRSE	Relative Risk Site Evaluation
S&R	Supervision and Review
SI	Site Inspection
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
TAPP	Technical Assistance for Public Participation

Acronyms & Abbreviations

TCAAP	Twin Cities Army Ammunition Plant
TCE	Trichloroethylene
TGRS	TCAAP Groundwater Recovery System (formerly BGRS)
TRC	Technical Review Committee
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Center
USATHMA	United States Army Toxic and Hazardous Material Agency (now called USAEC)
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WDE	Waste Disposal Engineering
WTP	Water Treatment Plant
WWII	World War II

Installation Information

Installation Locale: Historically, the Twin Cities Army Ammunition Plant (TCAAP) occupied approximately four square miles, or 2,370 acres, in northwest Ramsey County, Minnesota, and is within the Minneapolis/St. Paul metropolitan area. Some of the property has subsequently been transferred from the Army to other parties including the National Guard Bureau, Ramsey County, and the City of Arden Hills. Additional land transfers are in progress. For the purposes of this IAP, references to TCAAP are to the original area. TCAAP is still responsible for remediation on the reassigned and transferred property.

***Installation Mission*:** 774 acres of TCAAP were declared excess to the Department of Defense (DOD) in 2002.

Lead Organization:
Base Realignment and Closure Division (BRACD)

Lead Executing Agencies:
Investigation Phase: Installation and the US Army Environmental Center
Remedial Action Phase: Installation and US Army Corps of Engineers, Omaha District

Regulatory Participation:
Federal: US Environmental Protection Agency (EPA), Region V
US Fish and Wildlife Service
State: Minnesota Pollution Control Agency (MPCA)
Minnesota Department of Health (MDH)
Minnesota Department of Natural Resources (MDNR)

National Priorities List (NPL) Status: National Priorities List (NPL) in 1983

Projected Dates for Construction Completion: 2009

Projected Date for NPL Removal: 2040

Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation (TAPP) Status: The TCAAP Restoration Advisory Board (RAB) was established in 1996. Currently, the RAB consists of 8 community members and 4 non-community members. RAB meetings are held quarterly. A representative of the RAB has participated in every IAP Workshop. Community RAB members have the opportunity to participate in the Army/Regulatory Agency's Technical Review Committee meetings. Some community members have participated in Regional and National RAB Workshops.

Installation Program Summaries

IRP

Primary Contaminants of Concern: Volatile Organic Compounds (VOCs), especially Chlorinated Solvents; Explosives; Metals, especially lead; Semi-Volatile Organic Compounds (SVOCs), including Polychlorinated Biphenyls (PCBs) and Polynuclear Aromatic Hydrocarbons (PAHs)
Affected Media of Concern: Groundwater, Surface Water, Soil, Sediment
Estimated Date for Remedy-in-Place (RIP)/Response Complete (RC): 2008/2040
Funding to Date (up to FY05): $154,196,000
Current Year Funding (FY06): $2,172,000
Cost-to-Complete (FY07+): $30,463,000

Cleanup Program Summary

Installation Historic Activity:

The construction of TCAAP began on August 28, 1941, on a site that was primarily farmland. Field construction was completed in January 1943. The principal function of the facility was the manufacture of small caliber ammunition and related materials and 105mm and 155mm projectile metal parts, the proof testing of small caliber ammunition, and the storage and handling of strategic and critical raw materials for other government agencies. The majority of ammunition manufacturing occurred during WWII, the Korean Conflict, and the Southeast Asia Conflict. There were numerous tenants, most of which performed non-military, industrial based activities. The TCAAP Preliminary Assessment (PA) details activities of the various tenants.

The TCAAP facility is managed through an installation support services contract. The TCAAP facility has over 300 structures, including five major production buildings, numerous auxiliary buildings and supporting utilities, and a daytime population of approximately 250 people. The remaining 774 acres of TCAAP were declared excess to the needs of the DOD in 2002. Alliant Techsystems Inc. (ATK) [formerly part of Honeywell, Inc., which is a potentially responsible party (PRP) for the Site] manufactured fuses and selected ammunition at the facility between the late 1950s and 2004, when operations were terminated. ATK is cooperating with the Army in the cleanup of past contamination.

The 25-square mile New Brighton/Arden Hills Superfund Site (which includes the entire 4-square mile TCAAP facility) was proposed for addition to the National Priorities List (NPL) in 1982. The Superfund Site made the Final NPL in September 1983 with a hazard ranking index (HRI) score of 59.6.

A three-party Federal Facility Agreement (FFA) between the Army, EPA, and MPCA was implemented in December 1987. A two-party Defense, State Memorandum of Agreement (DSMOA)/Cooperative Agreement between the Army and MPCA became effective in June 1991. The regulatory driver for TCAAP is the Inter-Agency Agreement/Federal Facilities Agreement (IAG/FFA) associated with the NPL site. A Record of Decision (ROD) was completed for Operable Unit 3 (OU-3) in September 1992, Operable Unit 1 (OU-1) in September 1993, and Operable Unit 2 (OU-2) in December 1997. An Amendment to the OU-1 ROD was completed in May 2006. Fifteen sites are listed on the Resource Conservation and Recovery Act (RCRA) Permit, but are currently addressed under Comprehensive Environmental Response Compensation and Liability Act (1980) (CERCLA) (Sites B, F, and J are closed).

IRP

Prior Year Progress: TCAAP is a mature program with only four sites still in the RI/FS phase (TCAAP-23, EE/CA; TCAAP-25, FS; TCAAP-28, EE/CA; and TCAAP-30, EE/CA).

Future Plan of Action: These investigations and studies are planned to be completed by 2008. Remedies are expected to be in place for all sites by FY 2010. Response Complete for the installation is driven by several deep groundwater sites, expected to take decades to achieve cleanup levels. For programming purposes, it is assumed that Response Complete will be achieved in 2040.

Transfer Summary

Total Installation Acres: 650.25

Provide the follow information for all parcels

Parcel Name: Railroad Spur
Parcel Size: 20.25
Associated Sites: None
Transfer Date or Expected Transfer Date: 16-MAR-2007
Current Land Use: Industrial, Railroad Spur
Future Land Use: Industrial, Railroad Spur
Leases/Permits/Licenses: None
Transfer Strategy: Economic Development
Recipient: Ramsey County Regional Rail Authority
Other Issues Affecting Transfer: None

Parcel Name: Arden Hills Area
Parcel Size: 585
Associated Sites: TCAAP-05, 15, 16, 19, and 23
Transfer Date or Expected Transfer Date: 31-JUL-2007
Current Land Use: Industrial
Future Land Use: Mixed Use (Residential, Commercial, Industrial)
Leases/Permits/Licenses: None
Transfer Strategy: Economic Development Conveyance (EDC)
Recipient: City of Arden Hills
Other Issues Affecting Transfer: Negotiations are underway with the City of Arden Hills

Parcel Name: MNDOT
Parcel Size: 45
Associated Sites: None
Transfer Date or Expected Transfer Date: 16-MAR-2007
Current Land Use: Industrial (Highway)
Future Land Use: Industrial (Highway)
Leases/Permits/Licenses: None
Transfer Strategy: Public Benefit Conveyance
Recipient: Minnesota Department of Transportation
Other Issues Affecting Transfer: Negotiations are underway for transfer

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Installation Restoration Program

IRP Summary

Total AEDB-R IRP Sites/AEDB-R sites with Response Complete: 26/6

Different Site Types:

8	Contaminated Groundwater	2	Surface Disposal Areas
1	Contaminated Sediments	1	Disposal Pit/Dry Well
2	Landfills	3	Chemical Disposal
2	Firing Ranges	1	Small Arms Range
4	Burn Areas	2	Unexploded Munitions/Ordnance

***Most Widespread Contaminants of Concern*:** Volatile Organic Compounds (VOCs), especially Chlorinated Solvents; Explosives; Metals, especially lead; and Semi-Volatile Organic Compounds (SVOCs), including Polychlorinated Biphenyls (PCBs) and Polynuclear Aromatic Hydrocarbons (PAHs)

Media of Concern: Groundwater, Surface Water, Soil, Sediment

Completed Removal (REM)/Interim Remedial Action (IRA)/Remedial Action (RA):

- 26 UST/14 AST (1993) RC & deleted from AEDB-R
- Site J (1994) RC & deleted from AEDB-R
- (6) Groundwater Treatment Systems (A, C, K, OU-1, OU-2, OU-3)
- (3) Soil Vapor Extraction Systems (A, D, G)
- (1) PCB Soil Removal and Incineration (D)
- (4) Capping (D, G, 129-15, Outdoor Firing Range)
- (1) Soil Washing/Leaching (F)
- (1) Soil Removal (I)
- (1) Solid Waste Removal (Water Tower Area)
- (1) Alternate Water Supply/Well Abandonment

Total IRP Funding

Prior Years (up to FY05):	$154,196,000
Current Year Funding (FY06):	$ 2,172,000
Future Requirements (FY07+):	$ 30,463,000
Total:	$186,831,000

Duration of IRP

Year of IRP Inception: 1981
Year of IRP RIP/RC: 2008/2040
Year of IRP Completion including Long-Term Management (LTM): 2040

IRP Contamination Assessment

The IRP began in June 1981 when the Army and MPCA discovered chlorinated solvents or volatile organic compounds (VOCs) in TCAAP and New Brighton drinking water supplies, indicating that TCAAP may be the source of contamination. Residents were supplied with alternate water supplies as studies of TCAAP activities and groundwater were initiated.

TCAAP currently has a total of 26 Army Environmental Database - Restoration (AEDB-R) sites, 20 are active and 6 are Response Complete. These sites consist of contaminated groundwater, surface disposal areas, contaminated sediment, disposal pit/dry well, landfills, chemical disposal, firing ranges, small arms ranges, unexploded munitions/ordnance, and burn areas. After site characterization, the potential of encountering unexploded munitions/ordnance is low.

As a result of past TCAAP ammunition and munitions manufacturing operations, contamination has been detected in groundwater, soil, sediment, and surface water. The contaminants of concern are VOCs, especially Chlorinated Solvents; Explosives; Metals, especially lead; and SVOCs, including PCBs and PAHs.

The TCAAP IRP activities include three operable units – OU-1, OU-2, and OU-3. OU-3, which is the south TCAAP plume (TCAAP-27) located outside the fenced boundaries of TCAAP, was the first operable unit for which Remedial Action (RA) was initiated (pump and treat/containment system). The OU-3 Record of Decision (ROD) was signed in 1992. The RA consisted of construction of the Plume Groundwater Recovery System (PGRS), which started operation in 1994. Alliant Techsystems (ATK) is completely responsible for funding this activity. The Army/ATK were given regulatory approval to temporarily discontinue pumping this system because it had been pumping clean containment water for several years. Army/ATK submitted a technical memorandum evaluating groundwater data to support a final decision to discontinue pumping. Army/ATK, EPA, and MPCA are currently working on final language for a OU-3 ROD Amendment, which is expected to be signed in 2006. Monitoring will continue.

OU-1 was the second operable unit for which RA was initiated. Prior to the RA being initiated, an Interim Remedial Action (IRA) (pump and treat/containment system) was constructed and began operation. The OU-1 ROD was signed in 1993. The RA focuses on remediating deep groundwater contamination in the north TCAAP Plume (TCAAP-17), located off-site. This remediation includes the New Brighton Contaminated Groundwater Recovery System (NBCGRS), a municipal water-line interconnection, alternative well water supplies, additional production and monitoring wells and well advisories. An OU-1 ROD Amendment, dated May 2006, outlined an agreed-upon statistical method for evaluating aquifer restoration. Contaminant levels in the groundwater continue to decline.

The third operable unit, OU-2, includes 13 soil sites and/or dumps (TCAAP-01, 02, 05, 06, 07, 08, 09, 10, 11, 12, 13, 15, and 16), 4 shallow groundwater sites (TCAAP-01, 05, 15, and 16) and deep groundwater (TCAAP-19) within the boundaries of TCAAP. IRAs were initiated between 1986-1988 to pump and treat/contain the shallow and deep groundwater contamination. The OU-2 ROD was signed in December 1997 and included all the above-listed sites except TCAAP-08 (Site F) which has a regulator-approved Resource Conservation and Recovery Act (RCRA) Closure Report.

Sites on the New Brighton/Arden Hills NPL site being addressed as removal actions (REMs) include TCAAP-20, 21, 22, 23, 24, 25, 28, and 30.

In response to off-TCAAP groundwater contamination, the Army constructed the Boundary Groundwater Recovery System (BGRS) in 1987 to contain and treat the source area and contaminated groundwater plume emanating from the installation. The BGRS was later modified to become the TCAAP Groundwater Recovery System (TGRS). The Army also funded the construction of a permanent granular activated carbon (PGAC) treatment facility for the city of New Brighton to treat the contaminated groundwater within the “North Plume” of Operable Unit 1. The Interim PGAC became operational in 1990. During the same year, a groundwater treatment facility, funded by the EPA, was constructed for the city of St. Anthony. In 1994, the final PGRS became operational to contain and treat the contaminated groundwater within the “South Plume.”

Regulatory interest (state and federal) is very high since TCAAP is a NPL site and is Minnesota’s No. 1 environmental cleanup project. The Army continues an effective public involvement program with the community.

IRP Cleanup Exit Strategy

Of the 26 AEDB-R sites, 6 are Response Complete. Another 9 sites are planned for Response Complete in FY 2007, once land use control issues are resolved so that the final closeout reports can be approved. Three of these sites also require a ROD Amendment to document the selection of a soil cover as part of the final remedy. The field work has been completed at these 9 sites. Four sites are still in the investigation and/or study phase, so the decision documents will be integral to the strategy for getting to Response Complete. The remaining 7 sites have groundwater contamination, with estimated Response Complete dates ranging from 2013 to 2040, based on achieving site-specific cleanup standards.

Land Transfer Strategy:

See descriptions of the three pending transfers in the “Cleanup Program Summary” of this IAP. A Finding of Suitability to Transfer (FOST) document has been signed for the railroad spur parcel, and a FOST is currently being prepared for the road right-of-way. Army has no known future environmental requirements for those parcels. The goal is to transfer these two parcels in 2006.

The current strategy for the Arden Hills parcel is to transfer approximately 570 acres under a FOST and 15 acres under a Finding of Suitability for Early Transfer (FOSET). A covenant deferral request package is being prepared. Approval of the covenant deferral request by the EPA Regional Administrator and concurrence by the Minnesota Governor will be required. It is proposed to have the developer assume responsibility for further soil remedial actions on the property, and have Army retain responsibility for groundwater actions and five-year reviews. The goal is to transfer this parcel in 2007.

Previous Studies

2006 (current through the June IAP Workshop)

- Record of Decision Amendment, Groundwater Remediation, Operable Unit 1 at New Brighton/Arden Hills Superfund Site, May
- Wenck Associates, Inc.-Proposed Plan for Groundwater Remediation For Operable Unit 1 at the New Brighton/Arden Hills Superfund Site, March
- Shaw Environmental, Inc.-Final Technical Memorandum, Site C-2 Alternatives Evaluation, Revision 1, February
- Alliant Techsystems Inc. & Wenck Associates, Inc.-Outdoor Firing Range 1900 Yard Range Cover Construction: An Addendum to the "Final Closeout Report, Outdoor Firing Range and #150 Reservoir Site Soil Removal" (Revision 1, December 2001), February
- Wenck Associates, Inc. & Keres Consulting, Inc.-Groundwater Investigation Report for Building 102, January

2005

- OU1 Technical Group-Modification #1 To: Technical Memorandum, Statistical Evaluation Method for Operable Unit 1 Water Quality Data, October
- CRA-Proposed Plan for Groundwater Remediation for Operable Unit 3 at the New Brighton/Arden Hills Superfund Site, October
- Tecumseh/Wenck-Fiscal Year 2004 Annual Performance Report, September
- Tecumseh/Wenck-Off-TCAAP, Vapor Intrusion Pathway Analysis, Operable Unit 1, Operable Unit 3, and Operable Unit 2 (Site A), May
- CRA-Groundwater Statistical Evaluation, Operable Unit 3, Technical Memorandum in Support of Proposed Record of Decision (ROD) Amendment, May
- Tecumseh/Wenck-Summary Report for 535 Primer/Tracer Area Site Inspection Investigation, January
- Tecumseh/Wenck-Summary Report for 135 Primer/Tracer Area Site Inspection Investigation, January

2004

- Shaw Environmental, Inc.-Final Site G Volatile Organic Compound Investigation and Dump Close Out Report, Revision 2, December
- US Army CHPPM-Tier II Ecological Risk Assessment Report, Volumes I and II, December
- OU1 Technical Group-Technical Memorandum, Statistical Evaluation Method for Operable Unit 1 Water Quality Data, December
- Tecumseh/Wenck-Five-Year Review Report of the Final Remedy for the New Brighton/Arden Hills Superfund Site, September
- Wenck Associates, Inc.-Fiscal Year 2003 Annual Performance Report, July
- CRA-Final TGRS Operating Strategy, Modifications 1 through 3, May
- Shaw Environmental, Inc.-Final Construction, Operation, and Close Out Report, Corrective Action Management Unit, Volume IX, CAMU Activities, Revision 2, March

2004 continued

- Shaw Environmental, Inc.-Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume VII, Site D Activities, Revision 2, February
- Shaw Environmental, Inc.-Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume VIII, Site A Former 1945 Trench Activities, Revision 2, January

2003

- Wenck Associates, Inc.-Fiscal Year 2002 Annual Performance Report, August
- Stone & Webster-Phase II Sitewide Groundwater Monitoring Well Abandonment Completion Report, May
- CRA-Site K Remedial Action Report, February

2002

- Stone & Webster-Final Site 129-15 Dump Investigation, Characterization, and Remedial Action Completion and Close Out Report, Revision 3, December
- Wenck Associates, Inc.-Fiscal Year 2001 Annual Performance Report, December
- Stone & Webster-Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume V, Site 129-3 Activities, Revision 2, November
- Stone & Webster-Final Site D Shallow and Deep Soil Volatile Organic Compound Investigation and Close Out Report, Revision 2, August
- Stone & Webster-Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume IV, Site E Activities, Revision 2, June
- EnecoTech Midwest, Inc.-Summary Report for Grenade Range Groundwater Investigation at Marsden Lake, Revision 2, May
- Stone & Webster-Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume III, Site H Activities, Revision 2, February

2001

- Stone & Webster-Final Remedial Action Completion and Shallow Soil Sites Close Out Report plus Drawings, Volume I - Site A Activities, Volume II - Site 129-5 Activities, Revision 2, December
- Alliant Techsystems Inc.-Final Closeout Report, Outdoor Firing Range and #150 Reservoir Site, Soil Removal Action Completion of Soil Removal, Revision 1, December
- Alliant Techsystems Inc.-Final Preliminary Assessment, 135 Primer/Tracer Area, December
- Alliant Techsystems Inc.-Final Preliminary Assessment, 535 Primer/Tracer Area, December
- CRA-Site K Predesign Investigation Report, December

2001 continued

- Wenck Associates, Inc.-Fiscal Year 2000 Annual Performance Report, November
- Stone & Webster-Final Startup Report, Site A Soil Vapor Extraction/Air Sparging System, Revision 2, September
- Alliant Techsystems Inc.-Final Closeout Report, Grenade Range Soil Removal Action Completion of Soil Removal, July
- CRA-Dual Phase Vacuum Extraction Pilot Study, Predesign Investigation Report, Site I, March
- Stone & Webster-Final Site B Dump Investigation, Characterization, and Close Out Report, Revision 2, January

2000

- Argonne National Lab-Soil Vapor Extraction System: A Post-Audit Modeling Study, October
- CRA-Plume History Evaluation, Operable Unit 3, Twin Cities Army Ammunition Plant, Technical Memorandum in Support of Alliant Techsystems Inc.'s Request to Shut Down the Plume Groundwater Recovery System (PGRS) in Operable Unit 3 of the New Brighton/Arden Hills Superfund Site, October
- Wenck Associates, Inc.-Fiscal Year 1999 Annual Performance Report, October
- EPA-Evaluation of the Protocol for Natural Attenuation of Chlorinated Solvents: Case Study at the Twin Cities Army Ammunition Plant, September
- Montgomery Watson-OU-1 Remedial Action Report, August
- TVA-Final Report on the Demonstration Results for the Phytoextraction of Lead-Contaminated Soil at the Twin Cities Army Ammunition Plant, July
- EPA-Evaluation of Natural Attenuation of Chlorinated Solvents in Groundwater at the Twin Cities Army Ammunition Plant – Site A, June
- Alliant Techsystems Inc.-Removal Site Evaluation, Preliminary Assessment, Trap Range Site, February
- Alliant Techsystems Inc. -Results of Sampling and Analysis of Soil Vapor Extraction (SVE) Vents at Sites D and G, January

1999

- Wenck Associates, Inc.-Five-Year Review Report of the Final Remedy for the New Brighton/Arden Hills Superfund Site, September
- Stone & Webster-Final Field Investigation Report, Site G Tar-Like Material, Revision 2, August
- Alliant Techsystems Inc. -Site F Closure Certification Report, Volumes 1 - 3, July
- Wenck Associates, Inc.-Fiscal Year 1998 Annual Performance Report, July
- US Army CHPPM-Work Plan, Tier II Ecological Risk Assessment, June
- CRA-Inventory of Wells in the Vicinity of TCAAP, 1996/1997 Update, March
- Montgomery Watson-Alternate Water Supply Construction Report for Period 1997 through 1998, March

Previous Studies

1998

- EPA-Cognis Terramet Lead Extraction Process, Innovative Technology Evaluation Report, SITE Superfund Innovative Technology Evaluation, September
- Stone & Webster-Final Site A Engineering Evaluation/Cost Analysis, Revision 0, August
- Wenck Associates, Inc.-Fiscal Year 1997 Annual Performance Report and Drawings, August
- Barr Engineering-Construction Documentation Report, OU1 Modifications, Well 15 and Well 15 Wellhouse, July
- US Army CHPPM-Sediment Toxicity Evaluation of Round Lake, Preliminary Study, Tier II Ecological Risk Assessment (10-15 July 1995), June
- Stone & Webster-Final Field Sampling Report, Sites D and G, March
- US Army CHPPM-Bioavailability of Sediment-Metals in Round and Sunfish Lakes, Preliminary Study Tier II Ecological Risk Assessment, March
- Alliant Techsystems Inc. -Grenade Range Engineering Evaluation/Cost Analysis (EE/CA), December 1997, Revised March 1998, March
- Alliant Techsystems Inc. -Outdoor Firing Range Engineering Evaluation/Cost Analysis (EE/CA), March

1997

- US Army CHPPM-Tier I Screening Risk Assessment of Aquatic Ecosystems No. 39-EJ-1393-97 (October 1992 – July 1993), October
- USAEC-Operable Unit 2 Record of Decision, October
- Wenck Associates, Inc.-Fiscal Year 1996 Annual Monitoring Report and Drawings, September
- Barr Engineering-Construction Documentation Report, OU1 Modifications: Well 14 and Well 14 Wellhouse, August
- Wenck Associates, Inc.-“Road Map” for Army Agency Approval of Ordnance and Explosives Clearance Work Completed at TCAAP, June
- Wenck Associates, Inc.-Comprehensive Unexploded Ordnance Compilation Report, Volume I and Volume II, June
- CRA-Inventory of Wells in the Vicinity of TCAAP, 1995 Update, March
- Montgomery Watson-Operable Unit 2 Feasibility Study, March
- Alliant/GES-Community Relations Plan, February

1996

- Wenck Associates, Inc.-Fiscal Year 1995 Annual Monitoring Report and Drawings, October
- Barr Engineering-Construction Documentation Report, PGAC Raw and Waste Water Pipelines, City of New Brighton, Minnesota, January

Previous Studies

1995

- Loucks & Associates-Phase I Archeological Investigations of the Trap Shooting Area and CERCLA Site B, September
- Wenck Associates, Inc.-Fiscal Year 1994 Annual Monitoring Report and Drawings, September
- Argonne National Lab-Environmental Geophysics and Sequential Aerial Photo Study at Sunfish and Marsden Lakes, August

1994

- Wenck Associates, Inc.-Fiscal Year 1993 Annual Monitoring Report and Drawings, June
- CRA-TCAAP Operable Unit 2 Feasibility Study, Sites I & K Field Investigation Data Report, May
- Montgomery Watson -Final Site J Closure Report, March

1993

- Record of Decision, Groundwater Remediation Operable Unit 1, September
- Montgomery Watson -Feasibility Study, Final OU-1 FS, July
- Wenck Associates, Inc.-Fiscal Year 1992 Annual Monitoring Report and Drawings, July

1992

- CERCLA Administrative Record New Brighton/Arden Hills NPL Site, Master Record of Decision Index, November
- Wenck Associates, Inc.-Fiscal Year 1991 Annual Monitoring Report and Drawings, October
- Record of Decision, Groundwater Remediation Operable Unit 3, September
- CRA-Operable Unit 3 Feasibility Study, July

1991

- CRA-Groundwater Recovery System (TGRS), IRA-TGRS, Site I and Site K 1990 Annual Monitoring Report, Volumes 1 – 2, July
- Wenck Associates, Inc.-Fiscal Year 1990 Annual Monitoring Report and Drawings, July
- CRA-Groundwater Recovery System (TGRS), IRA-TGRS 1989 Annual Monitoring Report and Monitoring Plan, Volumes 1 – 2, June
- Argonne National Lab-Remedial Investigation Report - Volumes 1, 2, 3, & 4, April
- PRC-Human Health Risk Assessment New Brighton/Arden Hills Superfund Site - Volume I & II, April
- Camp Dresser & McKee-Phase IA Multi-Point Source Groundwater Remedial Investigation - Volume 1 & 2, + Drawings, February

1990

- IT Corporation-Characterization and Evaluation of Contaminated Soil and Sewer Sludge at Twin Cities Army Ammunition Plant, May

1990 continued

- Wenck Associates, Inc.-1989 Annual Monitoring Report, Volumes 1 – 3, May
- Wenck Associates, Inc.-Fiscal Year 1990 Annual Monitoring Plan, Volumes 1 – 3, April
- USAEHA-Ecological Assessment (February 1990 - April 1991) - Volume I & Appendices, February

1989

- CRA-Boundary Groundwater Recovery System (BGRS), IRA-BGRS 1988 Annual Monitoring Report and Monitoring Plan, Volume 1 – Text, Volume 2 – Appendices, October
- Wenck Associates, Inc.-1988 Annual Monitoring Report, Volumes I, II, III, IV, September

1988

- Camp Dresser & McKee-Final Remedial Investigation Report for New Brighton/Arden Hills, TCAAP Force Main, December
- Argonne National Lab-Preliminary Assessment of the Twin Cities Army Ammunition Plant and Drawings and Maps, February
- Argonne National Lab-Supplement to the Preliminary Assessment of the Twin Cities Army Ammunition Plant, February

1978

- USATHMA-Installation Assessment of Twin Cities Army Ammunition Plant, Report No. 129, October

TWIN CITIES ARMY AMMUNITION PLANT

Installation Restoration Program Site Descriptions

TCAAP-01
EARLY BURN/BURIAL AREA (SITE A)

SITE DESCRIPTION

Site A, approximately 12.3 acres, was used between the early 1940s and 1966 for burial and/or burning of various wastes, such as sewage sludge, solvents, explosive-containing wastes, and mercury crack cases. These activities resulted in the contamination of the shallow soil and shallow groundwater with volatile organic compounds (VOCs) and metals.

An Engineering Evaluation/Cost Analysis (EE/CA) was conducted which resulted in a Removal Action (REM) to prevent off-site migration of VOCs in the shallow aquifer. Eight extraction wells were installed in 1994, with discharge to the sanitary sewer. The OU-2 ROD (1997) designated the system as the final RA. Four of the wells were shut down in 2000, as the plume had reduced in size.

The OU-2 ROD also specified stabilization, excavation, and off-site disposal of the shallow, metals-contaminated soil to site-specific industrial standards. Approximately 16,226 cubic yards (cy) of contaminated soil were removed and disposed of in 1998-1999, which completed the field work. A closeout report for shallow contaminated soils received partial approval in 2001 from the regulators. Final approval is subject to resolution of land use control (LUC) issues.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: VOCs, Metals

MEDIA OF CONCERN: Soil, Groundwater

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199712	199806
IRA	198809	199712
RA(C)	199712	200709
RA(O)	199712	201309
LTM	201410	204009

RIP DATE: 200709
RC DATE: 201309

Additional site characterization was performed in 1997 that identified a disposal trench as the source of VOC contamination in the shallow soils. Following approval of an EE/CA, a REM was conducted for these soils. A soil vapor extraction (SVE)/air sparging system was operated between 2000-2002. Soil sampling in 2002 suggested that the SVE system would not achieve the cleanup levels. The regulators then approved a work plan for excavation and off-site disposal of the VOC-contaminated soil, and the SVE system was dismantled. Approximately 688 cy were removed in November 2002, which completed the field work. The closeout report for this work received regulatory approval in 2003.

TCAAP-01
EARLY BURN/BURIAL AREA (SITE A)

CLEANUP STRATEGY

Continue RA(O) of the shallow groundwater containment system, which will be funded under TCAAP-19. Five-year groundwater monitoring related to metals (2003-2007), which will be funded under TCAAP-19. Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for soil RA(C) closeout report (in 2007). LUC implementation (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-05
OPEN BURN AREA/SALVAGE AREA (SITE C)

SITE DESCRIPTION

Site C, approximately 6.4 acres, was used for burning scrap wooden boxes, solvents, oils, and production materials from 1947 through 1957. It was also used for land disposal and open storage.

The OU-2 ROD (1997) required excavation, stabilization, and off-site disposal of the contaminated soil to site-specific industrial standards. Excavation work during 2000-2002 removed approximately 16,475 cy of contaminated soil. Work stopped in July 2002 due to an issue raised by the regulators involving unanticipated site conditions. The issue involved whether excavation to groundwater was adequate (at this site, typically 2-5 feet below ground), or whether a revised remedy was needed. Additional characterization work was completed in November 2002 to assess the amount of contamination, which may be left in place below the water table. During review of the results and an alternatives analysis, the regulators requested additional sampling of sediments in ditches at the site, which was performed in 2003. Also, the regulators gave approval for excavation work to continue at the south end of the site, where contamination was less than 2 feet deep. Approximately 2,443 cy were removed in 2003. The alternatives analysis recommended a combination of excavation and/or placement of fill to provide a 4-foot soil cover to serve as a protective barrier between the ground surface and any contamination remaining in place. Further field work is on hold pending resolution of this issue with the regulators and RAB. It is proposed that a ROD Amendment will be signed in 2007, that field work will be completed in 2007, and the closeout report will get approved in 2007.

In 1997, USAEC sponsored a field demonstration project to phytoremediate lead-contaminated soil at Site C. The project had the unintended consequence of contaminating groundwater and surface water with lead. In 2000, the State took enforcement action. In 2004, a Stipulation Agreement was signed, thereby, resolving the enforcement action and directing that response actions be conducted under the authority of the FFA.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: Arden Hills Area

RRSE: High

CONTAMINANTS OF CONCERN: Metals

MEDIA OF CONCERN: Soil, Sediment, Surface Water, Groundwater

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
IRA	200207	200701
RA(C)	200001	200709
RA(O)	199712	201606
LTM	201606	204009

RIP DATE: 200709
RC DATE: 201606

With this development, the alternatives analysis and ROD Amendment discussed above in regard to soil and sediment, are being expanded to include groundwater and surface water. With this change, TCAAP-29 has been closed out and the activities have been incorporated into TCAAP-05.

CLEANUP STRATEGY

Resolve remedy issues, execute a ROD Amendment, amend the work plan, and complete the soil/sediment RA(C), including the closeout report.

Continue RA(O) of the groundwater containment system until site-specific standards are met (estimated to occur in 2011), which will be funded under TCAAP-19. The groundwater system also addresses surface water by minimizing the potential for contaminated groundwater to discharge to the surface water ditches.

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval of the RA(C) closeout report for all media of concern. LUC implementation, cover maintenance, and 5-year reviews (all funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-06
LEACH PITS/SOLVENT BURN (SITE D)

SITE DESCRIPTION

The pits on Site D, approximately 1.8 acres, were used for burning of sump wastes, scrap propellants, solvents, paint thinners, oils, rags and chemicals, in addition to the dumping of neutralized cyanide wastes from approximately 1949/1950 to 1968.

Interim remedial actions (IRA) included excavation of approximately 1,470 cy of PCB-contaminated soil, with subsequent on-site incineration in 1989. Residual PCB contamination is overlain by a 1/2-acre soil cover.

An 18-inch thick clay cover was installed at the site in 1985. An SVE system was implemented as an IRA in 1986, which was declared part of the final RA in the OU-2 ROD (1997). The SVE system removed 116,119 pounds (lbs) of chlorinated solvents from 1986-1998, at which time it was shut down and later dismantled. A closeout report for VOC-contaminated soil received partial approval from the regulators in 2002. Final approval is subject to resolution of land use control (LUC) issues. Groundwater monitoring related to VOCs is addressed as part of "Deep Groundwater" under TCAAP-19.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: VOCs, Metals, Nitroglycerin, PCBs

MEDIA OF CONCERN: Soil, Groundwater

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199602	200210
IRA	198510	199712
RA(C)	199712	200709
RA(O)	199712	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

Based on a separate ROD requirement, additional shallow soils characterization was completed in 2001 to assess metal contamination remaining at the site. In 2002, the regulators approved a work plan for soil excavation, stabilization, and disposal off-site. The site was cleaned up to site-specific industrial standards. Approximately 1,381 cy were removed in November 2002, which completed the field work. The closeout report for this work received partial approval from the regulators in 2004. Final approval is subject to resolution of LUC issues. The ROD also required five-years of groundwater monitoring to verify that there have been no impacts for metals and nitroglycerin.

CLEANUP STRATEGY

Execute a ROD Amendment to document the soil removal and LUCs (expected in 2007). Five-years of groundwater monitoring (2003-2007) will be funded under TCAAP-19.

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for soil RA(C) closeout reports (in 2007). LUC implementation and cover maintenance (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-07
CHEMICAL BURIAL AREA (SITE E)

SITE DESCRIPTION

In the early 1940s, Site E, approximately 8.8 acres, was used as both a construction debris and trash landfill and as a burning ground for ammunition boxes and other materials, including large quantities of unknown chemicals. Both the dump and the burning area were closed in 1949.

The OU-2 ROD (1997) required excavation, stabilization, and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial standards. Approximately 21,097 cy of contaminated soil were removed from the site from 1999-2001, which completed the field work. Also, a soil cover was constructed over approximately 1.6 acres of the site where asbestos-containing material remains in-place. A closeout report for shallow contaminated soils received partial approval in 2002 from the regulators. Final approval is subject to resolution of land use control (LUC) issues. The ROD also required five-years of groundwater monitoring to verify that there have been no impacts for metals.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: Metals

MEDIA OF CONCERN: Soil

PHASES	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	199810	200709
RA(O)	199712	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

CLEANUP STRATEGY

Five-years of groundwater monitoring (2003-2007) will be funded under TCAAP-19.

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the soil RA(C) closeout report (in 2007). LUC implementation and cover maintenance (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-09
LANDFILL (SITE G)

SITE DESCRIPTION

In Site G, approximately 4.6 acres, was used as a general dump area for the disposal of rubble, asphalt pavement, barrels, oil filters, rocket propellant research materials, floor-absorbent sweepings, metal dusts and grindings, burning operation ashes, and scrap roofing debris. Operations appear to have begun during WWII and continued through 1976.

An 18-inch thick clay cover was installed at the site in 1985. An SVE system was implemented as an IRA in 1986, which was declared part of the final RA in the OU-2 ROD (1997). The SVE system removed 104,418 lbs of chlorinated solvents from 1986-1998, at which time it was shut down. In 2002, the regulators approved revised remediation goals based on the existing cover minimizing the potential for leaching to groundwater. Beyond maintenance of the cover, no further action is required for VOC-contaminated soil. The SVE system was removed in 2003 with regulatory concurrence. Groundwater monitoring related to VOCs is addressed as part of "Deep Groundwater" under TCAAP-19.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: Chlorinated Solvents

MEDIA OF CONCERN: Soil, Groundwater

PHASES	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199602	200312
IRA	198509	199712
RA(C)	199712	200709
RA(O)	199712	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

The OU-2 ROD also required additional characterization to determine the appropriate course of action for the general dump. In 2003, the regulators approved a report discussing these matters, along with a work plan for improving the cover system. Construction of the approximately 4.4 acre cover was also completed in 2003. The remedy meets industrial solid waste rules. The closeout report for the VOC-contaminated soil and dump received partial approval from the regulators in 2004. Final approval is subject to resolution of land use control (LUC) issues.

CLEANUP STRATEGY

Execute a ROD Amendment to document the dump remedy and LUCs (expected in 2007).

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the RA(C) closeout report (in 2007). LUC implementation and cover maintenance (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-10
BURNING AREA/FILL SITE (SITE H)

SITE DESCRIPTION

Site H, approximately 11.7 acres, was a burning site with a burning cage located in the center. Burning (primarily wood, paper, cardboard, and combustible trash) took place from the early 1940s until the late 1960s. In addition to waste burning, portions of the site may have been used for burial and dumping of industrial sludge, paint residue, incineration ash, and solvents.

The OU-2 ROD (1997) required excavation, stabilization and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial standards. Approximately 8,615 cy of contaminated soil was removed from the site from 1999-2001, which completed the field work. Also, a soil cover was constructed over approximately 2.9 acres of the site where asbestos-containing material remains in-place. A closeout report for shallow contaminated soils received partial approval in 2002 from the regulators. Final approval is subject to resolution of land use control (LUC) issues. The ROD also required five-years of groundwater monitoring to verify that there have been no impacts for metals.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: Metals

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	199810	200709
RA(O)	199712	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

CLEANUP STRATEGY

Five-years of groundwater monitoring (2003-2007) will be funded under TCAAP-19.

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the soil RA(C) closeout report (in 2007). LUC implementation and cover maintenance (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-11
129-3 LEACHING PITS

SITE DESCRIPTION

Site 129-3, approximately 2 acres, had three leaching pits, which were used for disposal and flashing of contaminated wastewater, primarily from the lead styphnate primer mix facility that began operation in 1971 and ended about 1972. Disposal activity at the site may also have included the burning of scrap powder and lead styphnate wastes.

The OU-2 ROD (1997) required excavation, stabilization, and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial standards. Approximately 3,460 cy of contaminated soil was removed from the site from 2000-2001, which completed the field work. A closeout report for shallow contaminated soils received partial approval in 2002 from the regulators. Final approval is subject to resolution of land use control (LUC) issues. The ROD also required five-years of groundwater monitoring to verify that there have been no impacts for metals.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN:
VOCs, Metals, Nitroglycerin

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	200002	200709
RA(O)	199712	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

CLEANUP STRATEGY

Five-years of groundwater monitoring (2003-2007) will be funded under TCAAP-19.

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the soil RA(C) closeout report (in 2007). LUC implementation (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-12
129-5 BURN AREA WEST OF HAMLINE AVE

SITE DESCRIPTION

Site 129-5, approximately 7.2 acres, was used for open burning of scrap explosives, bullets, spent solvents, and disposal of primer/tracer sludge from about 1945/46 through the late 1950s. Areas of this site with observed surface debris were fenced in 1995.

The OU-2 ROD (1997) required excavation, stabilization, and off-site disposal of the contaminated soil. The site was cleaned up to site-specific industrial standards. Approximately 100 cy of contaminated soil was removed from the site in 1999, which completed the field work. A closeout report for shallow contaminated soils received partial approval in 2001 from the regulators. Final approval is subject to resolution of land use control (LUC) issues. The ROD also required five-years of groundwater monitoring to verify that there have been no impacts for metals.

CLEANUP STRATEGY

Five-years of groundwater monitoring (2003-2007) will be funded under TCAAP-19.

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the soil RA(C) closeout report (in 2007). LUC implementation (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: Medium

CONTAMINANTS OF CONCERN: Metals

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199708	199804
RA(C)	199810	200709
RA(O)	199712	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

TCAAP-13
129-15 LANDFILL

SITE DESCRIPTION

Site 129-15, approximately 2 acres, was used as a landfill for construction debris from 1970 through 1978.

Polynuclear aromatic hydrocarbons (PAHs) were discovered during preliminary characterization of the dumped material in 1994.

The OU-2 ROD (1997) required characterization to determine the appropriate course of action for the dump. Characterization was performed in fall 1998 and lead was also identified as a contaminant of concern. The regulators approved a soil cover as the remedy for the dump. Construction of the approximately 1.6 acre soil cover was completed in 2001. A closeout report received partial approval in 2002 from the regulators. Final approval is subject to resolution of land use control (LUC) issues. The site was cleaned up to site-specific industrial standards. No groundwater monitoring was required.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: Low

CONTAMINANTS OF CONCERN: PAH, Lead

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199806	200108
RA(C)	200108	200709
RA(O)	199712	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

CLEANUP STRATEGY

Execute a ROD Amendment to document the final remedy and LUCs (expected in 2007).

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the RA(C) closeout report (in 2007). LUC implementation and cover maintenance (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-15
INDUSTRIAL OPS BLDG 502 & AREA (SITE I)

SITE DESCRIPTION

Site I, approximately 43 acres, consists of Building 502 and its associated structures and facilities. Building 502 was constructed in 1942 and was initially used for the production of .30-caliber ammunition. In 1944, the facility was converted to the production of 105-millimeter projectiles. When projectile production ended in 1945, a portion of the building was converted to storage, repair, and maintenance of ordnance processing machinery. During the early 1950s, the building was rehabilitated for the manufacture, storage, and shipment of artillery ammunition components. In 1958, Honeywell Defense Systems (now Alliant Techsystems Inc. [ATK]) assumed responsibility for general manufacturing activities in Building 502. In the late 1980s, ATK excavated a few thousand cubic yards of PCB-contaminated soil from around the building, which was stored on-site with regulatory agency concurrence. This material was disposed of in 1998 at an off-site facility. ATK discontinued manufacturing in the building in 2004.

The ROD requirement for additional characterization of Unit 1 and Unit 2 soil and groundwater was completed in 1999, and helped define the geologic conditions and extent of contamination for the purpose of designing a remedy pilot study. An engineering study completed in 2001, indicated that the ROD requirement for extraction of shallow groundwater is not feasible at this site.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: Arden Hills Area

RRSE: High

CONTAMINANTS OF CONCERN: Chlorinated Solvents, PCBs

MEDIA OF CONCERN: Soil, Groundwater

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199707	200103
IRA	198508	198608
RA(C)	200103	200709
RA(O)	199712	204009
LTM	204009	204009

RIP DATE: 200709
RC DATE: 204009

CLEANUP STRATEGY

Continue RA(O) of the shallow groundwater remedy (monitoring) until site-specific standards have been met (2040), which will be funded by ATK.

Execute a ROD Amendment (expected in 2007) to discontinue the ROD requirement for pumping and treatment (funded by ATK).

Resolve land use control (LUC) issues (expected in 2007). LUC implementation and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

Contaminated soils underneath Building 502 will be addressed when the building is removed.

TCAAP-16
INDUSTRIAL OPS BLDG 103 & AREA (SITE K)

SITE DESCRIPTION

Site K, approximately 21 acres, consists primarily of Building 103, a two-story structure built in 1943. The building comprised more than 410,000 square feet and was used for munitions manufacturing and assembly operations during WWII. During the early 1950s, the building was reactivated for the production of small caliber ammunition, and various solvents were used to clean machines, parts, and floors. In 1952, for example, solvents were used at a rate of 1,000 gallons per week. The building was deactivated after the Korean Conflict. In 1961, the operations were again reactivated for the production of fuses, mines, and weapon systems by Honeywell and subsequently Alliant Techsystems Inc. (ATK). Building 103 was demolished in 2006. The concrete slab remains in place.

A containment pump and treat system (IRA), started in 1985, is currently operating at the site to remove chlorinated solvents from the shallow groundwater. The OU-2 ROD (1997) designated this system as part of the final RA. Other ROD requirements, such as further investigating the source area and installing a deep monitoring well, have been completed. In 2003, the Remedial Action Completion Report (remedy in place and properly working) for shallow groundwater was approved by the regulators.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: Arden Hills Area

RRSE: High

CONTAMINANTS OF CONCERN: Chlorinated Solvents

MEDIA OF CONCERN: Soil, Groundwater

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199707	200112
IRA	198508	199712
RA(C)	199712	200112
RA(O)	199712	204009
LTM	204009	204009

RIP DATE: 200112
RC DATE: 204009

CLEANUP STRATEGY

Continue RA(O) of the groundwater pump and treat system until site specific standards are met (2040), which will be funded by ATK.

Resolve land use control (LUC) issues in 2007. LUC implementation and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until site specific standards are met in 2040, and then become LTM.

Contaminated soils underneath Building 103 will be addressed when the slab is removed.

TCAAP-17
OU-1 DEEP GROUNDWATER

SITE DESCRIPTION

Past industrial activities at TCAAP have resulted in VOC contamination of deep aquifers (Units 3 and 4). Off-post, the VOC plumes diverge into two plumes termed the north plume (TCAAP-17) and south plume (TCAAP-27). Operable Unit 1 addresses the north plume. Operable Unit 3 addresses the south plume.

A permanent granular activated carbon (PGAC) treatment facility with a capacity of 3,900 gallons per minute was installed in New Brighton in June 1990 to treat contaminated municipal wells. As an integral part of New Brighton's municipal water supply system, the treatment plant both supplies drinking water to area residents and aids in the remediation of the off-TCAAP contaminated groundwater plume.

The OU-1 ROD (1993) required additional extraction wells for containment of the plume. Construction was completed in 1998. RA(O) is executed by New Brighton using funding established by a settlement agreement with the Army in 1992.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN:
Chlorinated Solvents

MEDIA OF CONCERN:
Groundwater

Phases	Start	End
PA	198702	199006
SI	198702	199006
RI/FS	198702	199307
RD	199002	199705
IRA	199309	199803
RA(C)	199309	200005
RA(O)	199803	204009
LTM	204009	204009

RIP DATE: 200005
RC DATE: 204009

Other ROD requirements include alternate water supply/well abandonment, well advisory, monitoring, and reporting, which are funded under TCAAP-19.

In May 2006, a ROD Amendment was executed which replaces the requirement for containment with a requirement to demonstrate aquifer restoration, through statistical evaluation of monitoring results.

CLEANUP STRATEGY

Operation of the groundwater treatment system is expected to continue until site-specific standards are met (through 2040), at which time delisting of Operable Unit 1 will occur (shown as LTM phase).

TCAAP-19
OU-2 DEEP GROUNDWATER

SITE DESCRIPTION

This site addresses deep groundwater contamination in lithological Units 3 & 4 within the original TCAAP boundary.

A containment pump and treat system (IRA) was completed in June 1987. Known as the TCAAP Groundwater Recovery System (TGRS), the IRA included 12 extraction wells along the southwest boundary to capture contamination migrating off-post, and five source control wells near known contamination sources. Discharge water from the wells is treated through air strippers and recharged via the TCAAP gravel pit. A fraction of the treated water is treated further with granular activated carbon, and used by the occupants of TCAAP.

The OU-2 ROD (1997) designated the TGRS as the final RA, and required a reconfiguration analysis to optimize mass removal. The resulting TGRS Operating Strategy was approved by the regulators in 2003 (and subsequent modifications adjusting flow rates have also been approved).

Funding for TCAAP-19 also includes Annual Performance Monitoring and Reporting, Five-Year Reviews (the next review is scheduled for 2009), Well Abandonment, Administrative Record management, and RA(O) activities conducted by the Installation Support Services Contractor for TCAAP sites.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: Arden Hills Area

RRSE: High

CONTAMINANTS OF CONCERN:
Chlorinated Solvents

MEDIA OF CONCERN:
Groundwater

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	199703
RD	199712	200306
IRA	198606	199712
RA(C)	199712	200306
RA(O)	199712	204009
LTM	204009	204009

RIP DATE: 200306
RC DATE: 204009

CLEANUP STRATEGY

Resolve Modification #4 and continue to conduct RA(O) of the TGRS, which is expected to run until site-specific standards are met (through 2040), at which time delisting of Operable Unit 2 will occur (shown as LTM phase).

Continue to complete RA(O) activities for other TCAAP sites (TCAAP-01, -05 through -13, -15 through -17, -20, -21, -23, -25, -27, and -28) that are being executed through the Installation Support Services Contract, which is funded under TCAAP-19.

TCAAP-20
GRENADE TESTING AREA

SITE DESCRIPTION

The M550 Grenade Range, approximately 19 acres, consisted of two launching structures and three landing pads. The range was operated by Honeywell Defense Systems Division, now Alliant Techsystems, from March 1967 until July 1975.

Based on an EE/CA (1999) and an Action Memorandum (1999), a Removal Action was implemented, consisting of excavation, stabilization, and off-site disposal of contaminated soil. The site was cleaned up to site-specific industrial standards. Approximately 2,179 cy of contaminated soil were removed in 1999, which completed the field work. A closeout report received partial approval in 2002 from the regulators. Final approval is subject to resolution of land use control (LUC) issues. Per the Action Memorandum, four-years of groundwater monitoring was conducted to verify that there were no impacts for metals.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: Metals

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	199307	199310
SI	199310	199501
RI/FS	199411	199803
RD	199901	199903
RA(C)	199903	200709
RA(O)	200010	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

CLEANUP STRATEGY

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the soil RA(C) closeout report (in 2007). LUC implementation (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-21
OUTDOOR FIRING RANGE TEST AREA

SITE DESCRIPTION

The Outdoor Firing Range, approximately 150 acres, consisted of three bullet catchers that were used for the testing of ammunition from the 1950s through the 1970s.

Based on an EE/CA (1999) and an Action Memorandum (1999), a Removal Action was implemented, consisting of excavation, stabilization, and off-site disposal of contaminated soil. The site was cleaned up to site-specific industrial standards. Approximately 990 cy of contaminated soil were removed in 1999, which completed the field work. A closeout report received partial approval in 2001 from the regulators. Final approval is subject to resolution of land use control (LUC) issues.

Near one of the range backstops, called the 1900-yard range, soil was found to be contaminated with polynuclear aromatic hydrocarbons (PAHs). In 2003, the regulators approved a work plan for placing a soil cover over roughly a 1/2-acre area. The cover was initially constructed in 2003, with additional cover material placed in 2004. An Addendum to the closeout report received partial approval in 2006, pending resolution of LUC issues.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: PAH, Metals

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	199310	199408
SI	199404	199612
RI/FS	199608	199803
RD	199806	199903
RA(C)	199904	200709
RA(O)	200209	200709
LTM	200709	204009

RIP DATE: 200709
RC DATE: 200709

CLEANUP STRATEGY

Resolve LUC issues (expected in 2007) in order to obtain final regulatory approval for the soil RA(C) closeout report (in 2007). LUC implementation and cover maintenance (National Guard) and 5-year reviews (funded under TCAAP-19) will continue indefinitely, and are considered RA(O) until Response Complete, and then will be considered LTM.

TCAAP-23
BUILDING 135 PRIMER/TRACER AREA

SITE DESCRIPTION

This area, approximately 65 acres, consisted of Building 135 and associated structures and utilities dedicated to the manufacture of small caliber ammunition primer and tracer mixtures. The manufacturing period included all of TCAAP production.

A site-wide preliminary assessment was performed for TCAAP in 1988; however, the primer/tracer areas were part of an Army mobilization mission at that time, so they were not investigated. Likewise, during the site-wide remedial investigation completed in 1991, this area was not included. Limited soil sampling was performed in 1996 to obtain a Relative Risk Site Evaluation (RRSE) score.

A Preliminary Assessment (PA) was approved in FY 2002, which recommended that a Site Inspection (SI) be performed. The SI field work was completed in 2002, and the report was approved in 2005. The SI report recommended that an EE/CA be performed to better delineate the extent and magnitude of contamination, and to evaluate the appropriate response action.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: Arden Hills Area

RRSE: Low

CONTAMINANTS OF CONCERN: VOCs, SVOCs, PCBs

MEDIA OF CONCERN: Soil, Sediment

Phases	Start	End
PA	197801	198802
SI	199509	199609
RI/FS	200001	200501
RD	200610	200712
RA(C)	200712	200912
LTM	200912	204009

RC DATE: 200912

A stormwater outfall from the primer/tracer area resulted in contamination of ditch sediments with polynuclear aromatic hydrocarbons. This contamination was on a parcel of land (Rice Creek Area) that was transferred to Ramsey County, and action at this area was expedited to facilitate the transfer. Approximately 1,256 tons of contaminated sediments were excavated and landfilled off-site in 2005, achieving unrestricted use cleanup levels. A closeout report is currently being reviewed for regulatory approval.

CLEANUP STRATEGY

Prepare an EE/CA and document the selected action through a decision document. Based on the SI report, it is expected that a removal action will be required for soils/sediments. For program planning purposes, assume the removal action will be excavation, and landfilling of contaminated soils and LUCs. No action is expected for groundwater. Based on current information, RD, RA(C), and LTM will be required. It is anticipated that LUCs will be funded under TCAAP-19.

TCAAP-25
ROUND, SUNFISH AND MARSDEN LAKES

SITE DESCRIPTION

Sunfish, Marsden, and Round Lakes received runoff from TCAAP operations. Also included in this site are Pond G and Rice Creek. All public activity at Round Lake is prohibited by the US Fish and Wildlife Service. There is no public access to Sunfish and Marsden Lakes, and Pond G, which are located within the fenced TCAAP/National Guard boundary.

US Army Center for Health Promotion and Preventive Medicine (USACHPPM) performed a phased investigation and an ecological risk assessment for the surface water and sediments in these lakes. The Final Tier I Ecological Risk Assessment was approved by the regulators in November 1997. The Tier II Ecological Risk Assessment Work Plan was approved by the regulators in June 1999.

The final Tier II Ecological Risk Assessment Report, approved in 2004, concluded that the risks are low for all of the water bodies, except Round Lake. A Feasibility Study (FS) is being prepared to help determine the appropriate remedy or No Further Action (NFA) for each of the aquatic sites. US Fish and Wildlife is a key stakeholder in this process.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN:
Metals, PCBs

MEDIA OF CONCERN:
Sediments, Surface Water

Phases	Start	End
PA	197801	198802
SI	197801	198802
RI/FS	198702	200709
LTM	200809	204009

RC DATE: 200709

CLEANUP STRATEGY

Perform additional sampling in Marsden Lake and Pond G to assess water quality and to determine if further action is required in these waterbodies.

Prepare a FS and document the remedy through a Decision Document. For program planning purposes, it is assumed that No Further Action will be selected for five of the aquatic sites (Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South, and Pond G). It is unclear what, if any, remedy will be needed for Round Lake, so no RA(C) funding has been programmed at this time.

TCAAP-27
OU-3 DEEP GROUNDWATER

SITE DESCRIPTION

Past industrial activities at TCAAP have resulted in VOC contamination of deep aquifers (Units 3 and 4). Off-post, the VOC plumes diverge into two plumes termed the north plume (TCAAP-17) and south plume (TCAAP-27). Operable Unit 3 addresses the south plume. Operable Unit 1 addresses the north plume.

The OU-3 ROD (1992) required construction of an extraction well to hydraulically contain the south plume. The water was treated by granular activated carbon (GAC) in a facility operated by the City of New Brighton, and was discharged to the New Brighton municipal water system. The RA(O) started in 1994 and was executed by New Brighton, with reimbursement of costs by Alliant Techsystems Inc. (ATK). Levels of contamination were below action levels beginning in late 1998 at the containment boundary, however there are still areas above site-specific standards upgradient. TCAAP received regulatory approval in 2001 to temporarily stop pumping for remediation purposes. The extraction well and treatment system are currently in "stand-by" mode and groundwater monitoring continues. A Technical Memorandum has been prepared that evaluates the historical groundwater data and recommends a final decision to terminate the requirement for groundwater extraction and treatment. A ROD Amendment is being prepared to document the decision.

Other RA(O) activities include alternate water supply/well abandonment and a well advisory, which are funded under TCAAP-19.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN:
Chlorinated Solvents

MEDIA OF CONCERN:
Groundwater

Phases	Start	End
PA	198712	198804
SI	198712	198804
RI/FS	198804	199207
RD	199207	199305
RA(C)	199305	199404
RA(O)	199404	204009
LTM	204009	204009

RIP DATE: 199404
RC DATE: 204009

CLEANUP STRATEGY

It is anticipated that a ROD Amendment will be executed in 2006, documenting that the extraction well is no longer needed for remediation purposes (funded by ATK).

Groundwater monitoring RA(O) will continue until site-specific cleanup levels are achieved, which is estimated at 2040, with this activity funded by ATK. Five-year reviews (funded under TCAAP-19) will likewise continue until cleanup levels are achieved.

TCAAP-28
BLDG. 535 PRIMER/TRACER AREA

SITE DESCRIPTION

This area, approximately 75 acres, refers to Building 535 and an array of associated production building foundations and grounds used for the production of primer, tracer, and incendiary mixtures from 1941 through the early 1960s. Approximately fifty of the structures were burned down during the 1960s. This site is now on property controlled by National Guard; however, restoration program activities are being conducted by TCAAP.

A site-wide preliminary assessment was performed for TCAAP in 1988; however, the primer/tracer areas were not investigated. Likewise, during the site-wide remedial investigation completed in 1991, this area was not included. Limited soil sampling was performed in 1996 to obtain a Relative Risk Site Evaluation (RRSE) score for this site.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: Medium

CONTAMINANTS OF CONCERN: Metals, SVOCs

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	197801	198802
SI	199610	199610
RI/FS	200001	200501
RD	200610	200712
RA(C)	200712	200912
LTM	200912	204009

RC DATE: 200912

A Preliminary Assessment (PA) was approved in FY 2002, which recommended that a Site Inspection (SI) be performed. The SI field work was completed in 2003, and the report was approved in 2005. The SI report recommended that an EE/CA be performed to better delineate the extent and magnitude of contamination, and to evaluate the appropriate response action.

CLEANUP STRATEGY

Prepare an EE/CA and document the selected action through a decision document. Based on the SI report, it is expected that a removal action will be required for soils. For program planning purposes, it is assumed that the removal action will be excavation, and landfilling of contaminated soils and LUCs. No action is expected for groundwater. Based on current information, RD, RA(C), and LTM will be required. It is anticipated that LUCs will be funded under TCAAP-19.

TCAAP-29
AEC PHYTOREMEDIATION DEMONSTRATION AREAS

SITE DESCRIPTION

In 1997, AEC sponsored a field demonstration project to phytoremediate lead-contaminated soil using Ethylenediaminetetraacetic Acid (EDTA) at Sites C and 129-3 at TCAAP. The demonstration project operated for two years. EDTA was applied to 90-foot by 90-foot plots at Site C and at Site 129-3 to facilitate the uptake of lead by crops that were planted on site. At Site C, lead and EDTA migrated to the shallow groundwater table beneath the demonstration plot. It was unclear at that time what impacts had occurred at Site 129-3. The MPCA issued a Notice of Violation (NOV) for both Site C and Site 129-3. Army Materiel Command determined that the corrective action was eligible for ER,A funds, so TCAAP-29 was created.

The Army put in place a groundwater containment system to control the migration of lead-contaminated groundwater from Site C. At Site 129-3, no further action is needed. In April 2004, a Stipulation Agreement was signed, thereby, resolving the enforcement action and directing that response actions be conducted under the authority of the FFA. With the groundwater and surface water aspects then under the same regulatory framework as for soils and sediment at Site C, it made sense to take a holistic approach to both the remedy(ies) and funding. Accordingly, in 2005, TCAAP-29 was considered Response Complete in AEDB-R, with future actions and costs moved to TCAAP-05.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: High

CONTAMINANTS OF CONCERN: Metals

MEDIA OF CONCERN: Soil, Groundwater, Surface Water

Phases	Start	End
PA	200008	200008
RI/FS	200008	200106
RD	200008	200106
IRA	200011	200107
RA(C)	200106	200107
RA(O)	200107	200410

RIP DATE: 200107
RC DATE: 200410

CLEANUP STRATEGY

Continue to conduct RA(O) and LTM for surface water and groundwater, under TCAAP-05, until risk-based cleanup levels are achieved.

TCAAP-30
BUILDING 102 DEGREASING OPERATIONS

SITE DESCRIPTION

Building 102 was constructed in 1942 and was used periodically until the mid-1980s for production of small caliber ammunition and various other munitions components. Historical records indicate that portable degreasing machines were used in Building 102 during the early 1950s to reactivate production equipment for the Korean crisis.

Contamination was discovered emanating from beneath Building 102 during the Phase I and Phase II Environmental Site Assessment (ESA) conducted between March 2002 and February 2004 in support of land transfer. Additional groundwater investigation work, including installation of monitoring wells, was performed and documented in a Groundwater Investigation Report (January 2006). The ESA-related work served as the Preliminary Assessment and Site Inspection phases.

The RI was considered to start in January 2006 when the Groundwater Investigation Report recommended that an EE/CA be performed to better delineate the extent and magnitude of contamination, and to evaluate the appropriate response action.

STATUS

REGULATORY DRIVER: CERCLA

PARCEL NAME: None

RRSE: Low

CONTAMINANTS OF CONCERN:
Chlorinated Solvents

MEDIA OF CONCERN:
Groundwater

Phases	Start	End
PA	200203	200301
SI	200301	200601
RI/FS	200601	200803
RD	200703	200803
RA(C)	200803	200807
RA(O)	200807	202807
LTM	202807	204009

RIP DATE: 200807
RC DATE: 202807

CLEANUP STRATEGY

Prepare an EE/CA and document the selected groundwater action through a decision document. For program planning purposes, assume the removal action will be groundwater extraction and discharge to the sanitary sewer, with LUCs, until site-specific cleanup goals are achieved. Since the building and land are going to be transferred and re-developed, the regulators have agreed to defer any soil or vapor issues to the developer.

IRP No Further Action Sites Summary

AEDB-R #	Site Title	Documentation/Reason for NFA	NFA Date
TCAAP-02	Sewage Sludge Burial (Site B)	No contamination was found. The site closeout report recommended NFA and received regulatory approval.	200104
TCAAP-08	Chemical Burn/Burial Area (Site F)	Soil contamination was remediated to unrestricted use levels. The Closure Report recommended NFA and received regulatory approval.	200009
TCAAP-22	Water Tower Area	Solid waste was removed from the site and the regulators approved NFA.	199608
TCAAP-24	Recreational Trap-Shooting Area	No contamination was found. The site closeout report recommended NFA and received regulatory approval.	200009
TCAAP-26	All Uncharacterized Sites	The PA/SI did not find contamination requiring further action.	199604

Initiation of IRP: 1981

1978

- *Installation Assessment of Twin Cities Army Ammunition Plant Report No. 129* comprised of site visit, records search, and employee interview information detailing waste management practices, October

1981

- Army and MPCA discovered chlorinated solvents or VOCs in TCAAP and City of New Brighton drinking water supplies, indicating that TCAAP may be the source of contamination, June

1983

- Army began supplying bottled water to residents outside the southwest TCAAP boundary and conducted a public meeting to discuss temporary granular activated carbon (GAC) treatment for New Brighton. In addition, the Army completed the TCAAP Environmental Survey Report (Phase I), to evaluate the extent and sources of VOC contamination, May
- Temporary GAC treatment facility for the City of New Brighton became operational, June
- TCAAP/New Brighton/Arden Hills Proposed NPL site HRI evaluation was completed and changed to final status with a score of 59.6, September

1984

- Army completed the TCAAP Environmental Survey Report (Phase II), to evaluate the extent and sources of VOC contamination and to determine localized and regional impacts on VOCs in groundwater. Engineering Analysis of Alternative Remedial Measures (Phase III) was completed and indicated that implementation of a remedial action was essential at TCAAP Sites D and G, June

1986

- Soil Vapor Extraction (SVE) system, or soil-vacuuming technique for removing VOCs from the soil, became operational at TCAAP Site D, January
- SVE system for removing VOCs from the soil became operational at TCAAP Site G, February
- Air stripping units to remove VOCs from groundwater at TCAAP Sites I and K, managed by Honeywell, became operational.

1987

- TCAAP Groundwater Remediation Phase I: Boundary Groundwater Recovery System (BGRS), designed to capture contaminated groundwater from migrating beyond the southwest TCAAP boundary, became operational, October
- Three-party Army/EPA/MPCA Federal Facility Agreement (FFA) became effective, December

1988

- Preliminary Assessment (PA) report documenting and evaluating past TCAAP environmental data was completed, February
- Litigation Settlement Agreement (LitSAG) between the City of New Brighton and Army for permanent safe drinking water supply for the New Brighton municipal water system became effective, August
- Groundwater Recovery System (GRS) to remove VOCs from shallow groundwater and to reduce contamination migration from TCAAP Site A became operational, September

1989

- TCAAP Groundwater Remediation Phase II: TCAAP Groundwater Recovery System (TGRS), an expansion of the BGRS, designed to limit source contamination from entering the groundwater and to enhance the capture of contaminated groundwater from migrating beyond the southwest TCAAP boundary, became operational, January
- Litigation Settlement Agreement (LitSAG) between the City of St. Anthony and Army for permanent safe drinking water supply for St. Anthony municipal water system became effective, February
- Thermal treatment, by incineration, of 1,400 cubic yards of soil contaminated with polychlorinated biphenyls (PCBs) was completed, September

1990

- Permanent groundwater GAC treatment facility for the City of New Brighton became operational, June
- Permanent groundwater GAC treatment facility for the City of St. Anthony became operational, December

1991

- MPCA completed the Off-TCAAP Remedial Investigation (RI) report documenting the extent of environmental contamination outside the installation boundary, March
- EPA completed the Human Health Risk Assessment (HHRA) report describing TCAAP contamination exposure pathways and cancer risks on the population, May
- Army completed the On-TCAAP RI report documenting the extent of environmental contamination on installation property, July
- Army completed the Draft Tier I Ecological Risk Assessment (ERA) report describing the effects of environmental contamination on the wildlife habitat. A public meeting was conducted to present results from the On-TCAAP RI, the Off-TCAAP RI, HHRA, and ERA reports and to emphasize transition of the project to the Feasibility Study (FS) phase, November

1992

- Werlein (citizen) lawsuit settlement with 99 plaintiffs completed out of court, April
- OU-3 FS completed, recommending groundwater extraction for south plume containment using treated groundwater for municipal water supply, July
- OU-3 ROD signed. Well Inventory, Phase I completed, September
- Lowry Grove Trailer Park connected to safe municipal drinking water supply after contamination was discovered in the private well supplying the trailer park, December

1993

- Agreements defining responsibility and interactions between Alliant/New Brighton, Army/New Brighton, Army/Alliant, and New Brighton/Fridley became effective. New Brighton/Fridley Interconnection FS completed. OU-3 PGRS RD completed, March
- OU-3 PGRS RA construction start. An Engineering Evaluation/Cost Analysis (EE/CA) for Site A was completed for containment of contaminants along the north boundary of TCAAP, May
- New Brighton/Fridley Interconnection RD completed, June
- New Brighton/Fridley Interconnection construction started, July
- OU-1 FS and ROD completed, September
- Site A Removal Action Design completed. Grenade Range History (Preliminary Assessment) completed, October
- Construction started on Site A Removal Action, November
- Well Inventory Phase II completed, December

1994

- Site J Closure Report completed. OU-3 RA construction completed. OU-3 RA Operation Start-Up, April
- Site A Removal Action Start-Up. 1993 Annual Monitoring Report completed. Draft-Final OU-2 Feasibility Study completed, June
- New Brighton/Fridley Interconnection completed, July
- Grenade Range Treatability Study completed, October

1995

- Well Inventory Phase III completed. Grenade Range Phase II Investigation completed, January
- Regulatory Investigation of Downgradient Surface Water Body (Valentine Lake) completed, July
- Site A, Building 308 removal completed. Unexploded Ordnance (UXO) Search TCAAP CERCLA Sites completed. Corrective Action Management Unit (CAMU) Conceptual Design completed. OU-3 Control System Integration Final Design completed. Completed construction of OU-1 Raw Water Pipeline & PGAC modifications, September
- OU-1 Performance Monitoring Plan completed. Arden Manor Trailer Park municipal water hook-up completed, October
- TCAAP Restoration Advisory Board (RAB) formed, December

1996
- Received consistency for Water Tower Site Closure Report, August

1997
- Completed OU-2 Feasibility Study, March
- Initiated OU-1 Well 15 construction, April
- Defined private wells for abandonment and alternate water supply, May
- Completed soil characterization for Sites A, D, & G remedial design, June
- Field work for Final Site F Closure completed (with the exception of final cleaning of two soil storage/handling pad areas), October
- Final Report, Tier I Screening Risk Assessment of Aquatic Ecosystems received consistency, November
- OU-2 ROD signed, December

1998
- Final Site A Investigation Report received consistency, January
- Completed Grenade Range EE/CA. Completed Outdoor Firing Range EE/CA, March
- OU-2 Groundbreaking Event for Remedial Action after the ROD was signed for the final operable unit, May
- Completed CAMU construction for OU-2 soils. Completed RA Construction at OU-1, June
- Initiated Site A Shallow Soil RA. Initiated Pilot Study of SVE for Deep Soils at Site D, July
- Completed Site A EE/CA for VOC-contaminated soils and began REM. Initiated Outdoor Firing Range REM, August
- Initiated Sites B and 129-15 Dump Characterization. Initiated shutdown evaluation of current shallow SVE systems at Sites D & G, September
- Initiated REM for Tar-Like Substances at Site G, October

1999
- Received the Department of the Army Environmental Security Award – Environmental Cleanup Installation. Completed Site I Preliminary Design Investigation Work Plan, January
- Completed Site K Preliminary Design Investigation Work Plan, February
- Completed Construction Report (1997-1998 Wells). Completed 1996 Off-Post Well Inventory Update, March
- Completed Well 14 & 15 Test Report. Completed Tier II Ecological Risk Assessment Work Plan, June
- Completed 1998 Monitoring Report/2000 Plan, July
- Completed Site F Closure Report, August
- Completed Site G Shallow Soils EE/CA. Completed Outdoor Firing Range Work Plan, September
- Completed Five-Year Review Report – OU-1, OU-2, OU-3, October
- Completed Numerical Flow Model Report. Completed Grenade Range Work Plan, November

1999 (continued)

- Completed Site D & G Close-Out Investigation Work Plan, December
- OU-3 PGRS Pumping Rate Reduced by 50% in Response to Influent Concentrations Being Below MCLs Since 1997, December

2000

- Completed Site D & G Operations Modification Report. Completed Trap Range Preliminary Assessment, March
- Completed Operable Unit 1 RA 72-Hour Pump Test Report, May
- Completed Operable Unit 1 RA Construction Report, August
- Completed 1999 Monitoring Report/2001 Plan, September
- Completed Plume History Evaluation Operable Unit 3 Recommending Discontinuation of Pumping at the PGRS, October

2001

- Completed Site B Dump Investigation, Characterization, and Close Out Report. Completed OU-1 Hydraulic Analysis of Containment, January
- Completed Site K Predesign Investigation Report. Completed Site I Dual Phase Vacuum Extraction Pilot Study, Predesign Investigation Report. Completed Hydrogeologic Evaluation of Site C in Response to the Release of Lead to Groundwater During the Phytoremediation Demonstration Project, March
- Completed Closeout Report for Grenade Range Soil Removal Action. Completed Startup of Groundwater Pump-and-Treat System at Site C, July
- Completed Comprehensive Work Plan, Site 129-15 Dump Cover. Completed Startup Report for the Site A Soil Vapor Extraction/Air Sparging System. Completed FY 2002 Installation Action Plan, September
- Completed Site D SVE Dismantlement Report, October
- Completed Outdoor Firing Range and #150 Reservoir Site Soil Removal Action Closeout Report. Completed 135 Primer/Tracer Area Preliminary Assessment. Completed 535 Primer/Tracer Area Preliminary Assessment. Completed Predesign Investigation Report for Site K. Completed Remedial Action Completion and Shallow Soil Sites Close Out Report for Site A and Site 129-5 Activities, December

2002

- Completed Remedial Action Completion and Shallow Soil Sites Close Out Report for Site H Activities, February
- Completed Site Inspection for 135 Primer/Tracer Area, Work Plan, Field Sampling Plan, Site Specific Health and Safety Plan, March
- Completed Remedial Action Completion and Shallow Soil Sites Close Out Report for Site E Activities. Field Investigation Report for Site D Shallow Soils, June
- Technical Memorandum for the Site G Soil Leaching Values, July
- Site D Shallow and Deep Soil VOC Investigation and Close Out Report was completed, August

2002 (continued)

- Completed Remedial Action Completion and Shallow Soil Sites Close Out Report for Site 129-3 Activities. Completed Technical Memorandum for the Site C Characterization Work Plan, November
- Completed Site 129-15 Dump Investigation, Characterization, and Remedial Action Completion and Close Out Report. Completed the FY 2001 Annual Performance Report, December

2003

- Completed Remedial Action Report for Site K Activities, February
- Completed Phase II Sitewide Groundwater Monitoring Well Abandonment Completion Report. Completed 535 Primer/Tracer Area Site Inspection Work Plan, May
- Completed TGRS Operating Strategy, June
- Completed the Final Technical Memorandum for the Site G Dump Contents and Conceptual Design of a Dump Cover, July
- Completed the FY 2002 Annual Performance Report. Completed the FY 2004 Installation Action Plan, August
- Completed the Outdoor Firing Range, 1900 Yard Range Cover, Comprehensive Work Plan, Site Safety and Health Plan. Completed the Comprehensive Work Plan for the Site G Dump Cover, September

2004

- Completed the Remedial Action Completion and Shallow Soil Sites Close Out Report for the Site A Former 1945 Trench, January
- Completed the Remedial Action Completion and Shallow Soil Sites Close Out Report for Site D Activities, February
- Completed the Final Construction, Operation, and Close Out Report for the Corrective Action Management Unit (CAMU), March
- Completed the TGRS Operating Strategy Modifications 1 through 3, May
- Completed the FY 2003 Annual Performance Report, July
- Completed the Five-Year Review Report of the Final Remedy for the New Brighton/Arden Hills Superfund Site, September
- Completed the Technical Memorandum Statistical Evaluation Method for Operable Unit 1 Water Quality Data. Completed the Tier II Ecological Risk Assessment Report. Completed the Site G Volatile Organic Compound Investigation and Dump Close Out Report, December

2005

- Completed the Summary Report for 135 Primer/Tracer Area Site Inspection Investigation. Completed the Summary Report for 535 Primer/Tracer Area Site Inspection Investigation, January
- Completed the Groundwater Statistical Evaluation, Operable Unit 3, Technical Memorandum in Support of Proposed Record of Decision (ROD) Amendment. Completed the Off-TCAAP, Vapor Intrusion Pathway Analysis, Operable Unit 1, Operable Unit 3, and Operable Unit 2 (Site A), May

2005 (continued)

- Completed the Fiscal Year 2004 Annual Performance Report, September
- Completed the Proposed Plan for Groundwater Remediation for Operable Unit 3 at the New Brighton/Arden Hills Superfund Site. Completed the Modification #1 To: Technical Memorandum, Statistical Evaluation Method for Operable Unit 2 Water Quality Data, October

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates:
OU-2 ROD Amendment in 2007 affecting TCAAP-05, -06, -09, -13, and -15.
OU-1 ROD Amendment in 2006 affecting TCAAP-17.
OU-3 ROD Amendment in 2006 affecting TCAAP-27.
New ROD in 2007 affecting TCAAP-25.
Action Memorandums in 2008 affecting TCAAP-23, -28, and -30.

Projected Construction Completion Date of IRP: 2009

Projected Date for Removal from NPL: 2040

Schedule for Next Five-Year Review: 2009

Estimated Completion Date of IRP (including LTM phase): 2040

TWIN CITIES ARMY AMMUNITION PLANT IRP SCHEDULE

(Based on current funding constraints)

AEDB-R #	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
TCAAP-01	LTM									204009
TCAAP-05	RA(C)									
	LTM									204009
TCAAP-06	LTM									204009
TCAAP-07	LTM									204009
TCAAP-09	LTM									204009
TCAAP-10	LTM									204009
TCAAP-11	LTM									204009
TCAAP-12	LTM									204009
TCAAP-13	LTM									204009
TCAAP-15	LTM									204009
TCAAP-16	LTM									204009
TCAAP-17	LTM									204009
TCAAP-19	RA(O)									204009
	LTM									204009
TCAAP-20	LTM									204009
TCAAP-21	LTM									204009
TCAAP-23	RD									
	RA(C)									
	LTM									204009
TCAAP-25	RI/FS									
	RA(C)									
	LTM									204009
TCAAP-27	LTM									204009
TCAAP-28	RI/FS									
	RA(C)									
	LTM									204009
TCAAP-30	RI/FS									
	RD									
	RA(C)									
	RA(O)									202807
	LTM									204009

Prior Years Funds

Total Funding up to FY04: $152,098,000

FY05

Site Information	Expenditures	FY Total
RA(C) TCAAP-01	$3,000	
RA(C) TCAAP-05	$47,000	
RA(C) TCAAP-06	$3,000	
RA(C) TCAAP-07	$3,000	
RA(C) TCAAP-09	$10,000	
RA(C) TCAAP-10	$3,000	
RA(C) TCAAP-11	$3,000	
RA(C) TCAAP-12	$3,000	
RA(C) TCAAP-13	$3,000	
RA(O) TCAAP-19	$2,010,000	
RI/FS TCAAP-25	$10,000	**$2,098,000**

Total Prior Year Funds: $154,196,000

Current Year (FY06) Requirements

Year	Site Information	Requirements	FY Total
	RA(C) TCAAP-05	$47,000	
	RA(O) TCAAP-19	$1,495,000	
	RD TCAAP-23	$137,000	
	RI/FS TCAAP-25	$60,000	
	RI/FS TCAAP-28	$122,000	
	RI/FS TCAAP-30	$301,000	
	RD TCAAP-30	$10,000	$**2,172,000**

Total Future Requirements: **$30,463,000**

Total IR Program Cost *(from inception to completion of the IRP):* **$186,831,000**

Community Involvement

The TCAAP Restoration Advisory Board (RAB) was established in 1996. The RAB established a Mission Statement and Operating Procedures.

Currently, the RAB consists of 8 community members and 4 non-community members. RAB meetings are held quarterly. A representative of the RAB has participated in every IAP Workshop. Community RAB members have the opportunity to participate in the Army/Regulatory Agency's Technical Review Committee meetings. Some community members have participated in Regional and National RAB Workshops.

The RAB has two active committees: a Technical Committee, and a Communication/Membership Committee. The Technical Committee reviews and comments on technical documents. During the past year, the RAB Technical Committee provided input on IRP decisions such as evaluating alternatives for soil and sediment remediation at Site C, development of a statistical method for evaluation of aquifer restoration in OU-1, a ROD Amendment to terminate pump and treat for remediation purposes in OU-3, and evaluation of the groundwater remediation system at the Phytoremediation Demo Area. It is anticipated that the RAB Technical Committee will be involved in future remedy evaluation and/or selection for the 135 and 535 Primer/Tracer Areas, and the lakes (where a feasibility study is currently being prepared). The RAB was awarded a Technical Assistance for Public Participation (TAPP) Grant in 1999, which was used to provide support from the University of Minnesota.

The Communication/Membership Committee helps recruit RAB members and keeps the community informed. Three new RAB members joined in the past four years, while inactive members were removed as dictated in the operating procedures. The RAB has a website (TCAAPRAB.ORG). RAB members helped to communicate restoration activities to interested stakeholders in the early land transfer process through review of technical documents and participation in stakeholder meetings. The RAB has input to land use and institutional controls which will have impact on TCAAP.

The RAB received an award of appreciation from the State of Minnesota in 1999.

A Community Relations Plan is in place and was updated in 1997. TCAAP distributes a periodic newsletter to update the public on important restoration activities and milestones.

In response to a question raised at a RAB meeting in 2003 about depleted uranium (DU), three separate meetings outside of the IRP and RAB were conducted in 2004. EPA and NRC provided information to the public about the Nuclear Regulatory Commission (NRC) license decommissioning for Building 502 (license terminated in 2004).

This past year 2005, the RAB has been involved and focused much attention on the cleanup of TCAAP as it affects land transfer and reuse. In 2004, the US Army Center for Health Promotion and Preventive Medicine (USACHPPM) selected the TCAAP RAB to be involved in a RAB Evaluation Study. Preliminary results of the study indicate a high overall rating of TCAAP's RAB.